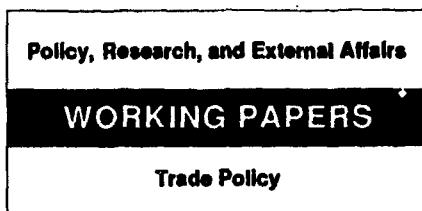


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How Should Tariffs Be Structured?

Arvind Panagariya

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Should all imports be taxed at uniform rates? Should intermediate inputs be subject to import duties? If so, should duty drawbacks play a role in exports?

This paper — a product of the Trade Policy Division, Country Economics Department — is part of a larger effort in PRE to study the design of tariff reform. Copies of this paper are available free from the World Bank, 1818 H Street NW, Washington DC 20433. Please contact Karla Cabana, room N10-037, extension 37946 (29 pages with figures).

Basing his analysis on intuitive arguments, supported by the literature and simple diagrams, Panagariya argues that:

- The introduction of tariffs on intermediate inputs complemented by duty drawbacks is welfare-improving.

- If the objective is to protect the import-competing sector, uniform tariffs will minimize the distortion in production but not in consumption. If the objective is revenue, uniform tariffs will in general fail to minimize distortion in either production or consumption.

- The existence of smuggling, imperfect competition, and economies of scale weaken the case for uniform tariffs. The principal justification for uniform tariffs is their transparency, administrative simplicity, and relatively low level of unproductive profit-seeking activities.

- Considerations of efficiency conflict with considerations of political economy. Ultimately the issue calls for more systematic empirical study.

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by
Arvind Panagariya*

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In the course of trade-policy reforms, countries must confront at least two important questions with respect to tariffs.¹ First, what is the optimal structure of tariffs? In particular, is it optimal to tax all imports at a uniform rate? Second, should intermediate inputs be subject to import duties and if so is there a role for duty drawbacks on exports? In the present paper I seek answer to these important questions in the context of a price-taking small open economy.

A central result in the pure theory of international trade is that in the absence of distortions a welfare maximizing small open economy should not impose any restrictions on foreign trade. Yet in practice, few countries adhere to the policy of free trade. A variety of objectives and constraints result in the adoption of trade restrictions. Three objectives which figure prominently in this context are self sufficiency, protection and revenue.² In

¹In the interest of simplicity and tractability, the discussion in this paper is limited to tariffs. Other types of intervention including quotas and domestic taxes are obviously important but for most part I choose to abstract from them. In any case, if quotas are to be replaced by tariffs, it is important to know the optimal structure of the latter under different circumstances.

²It may be noted that tariffs are not the first-best instrument for achieving the protection and revenue objectives unless administrative costs rule out domestic taxes as a viable source of revenue. If domestic taxes can be

addition, administrative convenience and political-economy considerations play a major role in the determination of a country's trade policy. Assuming that one or more of these objectives must be met, the issue is how best to achieve them.

In the present paper I synthesize and refine the existing literature aimed at answering this important question. I also raise some new issues which have important implications for trade policy reforms in developing countries. Special attention is paid to the treatment of imported intermediate inputs and the role of duty drawbacks on exports in the design of trade policy. A distinguishing feature of the paper is its intuitive but rigorous approach. The analysis in the text is presented with the help of graphs and minimal amount of algebra; all complicated proofs appear in an appendix available upon request from the author.

An additional contribution of the paper is the elaboration of the political-economy case for uniform tariffs. In conversations, practitioners often assert that political-economy considerations constitute an important reason for preferring uniform over nonuniform tariffs. Yet to my knowledge, the reasoning behind this assertion has simply not been laid out clearly.

Broadly speaking, the literature addressing the issues mentioned above has followed one of two traditions: the International Economics tradition or Public Economics tradition. Models which follow the former tradition assume that total factor supplies are fixed. Labor-leisure choice plays no role in these models. Moreover, lump-sum taxes are available via a uniform production or consumption tax on all commodities. Among key contributions in this tradition are Johnson (1964), Ramaswami and Srinivasan (1968), Bhagwati and

imposed, within the fixed factor-endowments framework, revenue can be raised costlessly by a uniform consumption or value added tax.

Srinivasan (1969) and Corden (1974).

Papers written in the Public Economics tradition assume that factors are supplied elastically. Labor-leisure choice plays a central role in these papers. The authors writing in this tradition are concerned solely with revenue raising taxes. Lump-sum taxes are not available here and Ramsey (1927) considerations play a key role in the determination of optimal taxes. The most important contributions in this tradition from the viewpoint of trade taxes are Boadway et al (1973), Dasgupta and Stiglitz (1974) and Dixit (1985). At a more general level, the seminal contribution remains Diamond and Mirrlees (1971).

The present paper follows exclusively the International Economics tradition. Thus, factor endowments are assumed to be constant throughout. In the early part of the paper, I rely heavily on a diagrammatic technique introduced by Johnson (1964). Towards the end of the paper, I give a brief summary of the literature in both International and Public Economics traditions.

The paper is organized as follows. In Section 1, I discuss the optimal tariff structure in the presence of self-sufficiency, protection and revenue objectives. For simplicity, it is assumed in this section that there are no intermediate inputs and nontraded goods. In Sections 2 and 3, I introduce successively pure intermediate inputs and nontraded goods. The principal issue in these sections is whether or not imported inputs should be subject to tariffs and if yes whether the latter should be combined with duty drawbacks on exports. Section 4 discusses the case for and against the uniform tariff. I argue that the case for uniformity must be based on administrative convenience, transparency and political-economy considerations rather than efficiency. Finally, Section 5 gives a brief history of the literature and Section 6 summarizes the paper.

1. Optimal Tariffs under Alternative Objectives

Let us begin with a discussion of optimal tariffs in the presence of alternative constraints. To keep matters simple, we will not attempt to derive the actual optimal tariff rates but simply discuss why they do or do not assume the uniform structure. The existence of all distortions including domestic taxes will be assumed away. Implications of these distortions for the optimal tariff structure will be mentioned briefly in Section 5.

In this section, I will assume that all goods are traded and that there are no intermediate inputs. As our interest is limited to a small country, we will assume that the world prices are fixed. Indeed, throughout the paper, by appropriate choice of units, we will set all world prices equal to unity.³

1.1 The Import Objective

Let us assume that motivated by self-sufficiency considerations, the country is interested in limiting the value of net imports of a group of commodities to a fixed level. This group may consist of some or all importables and may even include exportables. We will demonstrate that the cost of satisfying this import constraint is minimized by subjecting all imports to a uniform tariff (or subsidy in the case of exports).⁴

Assume that we want to limit the value of imports, at world prices, of commodities 1 and 2 to some prespecified level. In Figure 1, let us depict

³Thus, if 1.5 ounces of steel costs \$1, we measure steel in units of 1.5 ounces each.

⁴This result is valid in the presence of intermediate inputs as well as nontraded goods. A proof within the general-equilibrium model is provided in the appendix available upon request from the author.

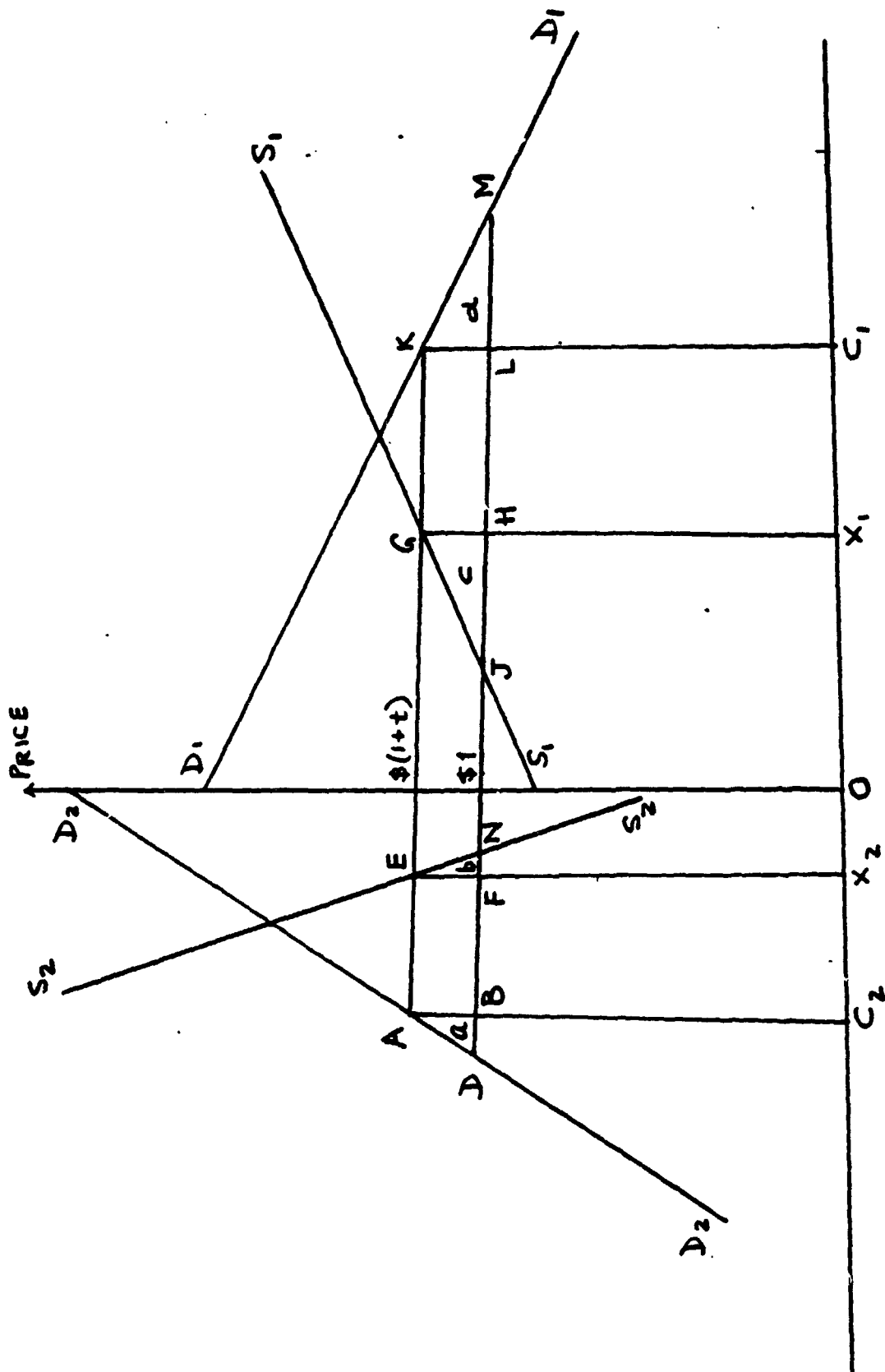
the demand and supply curves of the two commodities.⁵ In the first quadrant, I have drawn the demand and supply curves for commodity 1 in the usual fashion. In the second quadrant, the same is done for commodity 2 with positive quantities measured to the left from the origin. It is important to remember that we have chosen the units of various goods so as to equate the world price of each good equal to unity. Therefore, the horizontal axis in Figure 1 gives not only the quantity of the two goods but their value (at world prices) as well. Under free trade, quantities consumed and produced of the two goods are given by intersections of line DM with the relevant demand and supply curves.

Let us now suppose that the value of imports is to be limited to $X_1C_1 + X_2C_2$. This objective can be accomplished by a uniform tariff on the two commodities at rate t . The welfare loss due to the tariff is given by the sum of triangles indicated by a, b, c, and d.⁶ The important question is whether one can do better by taxing one commodity at a higher rate and the other one at a lower rate than t . The answer to this question is in the negative.

Suppose we lower the tariff on good 1 and raise that on good 2 by just enough to raise the imports of good 1 by \$1 and lower those of good 2 by the same amount. These changes will leave unchanged the total value of imports of the two goods. But given that the marginal costs of reducing imports in the

⁵Unless otherwise specified, the diagrammatic analysis will be based on the assumption that cross effects are absent. It is shown in the appendix that as long as complementarities in import demand are not strong, presence of cross effects will not alter our results.

⁶Observe that due to partial-equilibrium nature of the analysis, our construction in Figure 1 does not incorporate the substitution which takes place between goods 1 and 2 on the one hand and exports on the other.



5-a

two goods were equal at the uniform tariff rate t , a higher tariff on good 2 and lower one on good 1 will result in an increase in the cost of achieving the import objective. It is easy to verify that a rise in tariff on good 1 and decline in that on good 2 will lead to the same conclusion.

Several points deserve to be noted. First, it is evident that for a given value of imports, the larger the number of commodities in the constraint, the greater the welfare cost of achieving the objective. Thus, if we were to add another commodity in our example above, we will have to impose a higher tariff (than t) on all three commodities in order to hold their combined imports at the level indicated by $X_1C_1 + X_2C_2$.

Second, as already noted, tariffs (or equivalent quotas) are the first best instrument of meeting the import constraint. Imports are reduced most effectively by reducing consumption as well as increasing production. A tariff affects these variables simultaneously in the correct direction. By contrast, a consumption tax or production subsidy will work on only one of the two variables and impose a greater excess burden on the economy.

Finally, if externalities or other distortions are present in the economy, optimal tariff structure will be nonuniform and it will fail to reach the first best. The first best will require a combination of tariffs and the best instrument to correct the existing distortion. For a detailed discussion of this issue, see Panagariya (1980, 1983).

1.2 The Protection Objective

Let us now assume that the government is interested in maintaining the value (at world prices) of output of a group of commodities at a fixed level. The common rationale behind this objective is that it is necessary to build a manufacturing base in order foster sustained growth. To the extent that producers respond to the domestic profit opportunities more readily than to such opportunities available abroad and to the extent that profit

opportunities in the domestic manufacturing sector are limited in the early stages of development, it may make sense to protect the manufacturing sector for a while.

It is easy to show that the best instrument to achieve the protection objective is an output subsidy. Moreover, the optimal subsidy structure involves a uniform ad valorem subsidy to all industries included in the protected group and no intervention in the remaining industries (see Johnson, 1964 and Vandendorpe, 1974). In terms of Figure 1, suppose we want to ensure that the combined value of output of goods 1 and 2 is no less than $OX_1 + OX_2$. The optimal way to achieve this objective will be to subsidize the output of both goods at rate t . The reader may verify that any deviations from this policy will result in a larger welfare cost.

It is important to recognize that the conclusion stated in the previous paragraph depends critically on the assumption that revenues can be raised costlessly. If this assumption is not true, output subsidies by themselves will not be an optimal instrument of protection. Optimality will involve combining the protection constraint with a revenue constraint and solving for the relevant tax-subsidy structure simultaneously. In the Diamond-Mirrlees type of models this will involve consumption taxes to raise revenue and output subsidies to meet the protection objective. In the present model with fixed endowments, a uniform tax on consumption (or production) will enable us to raise revenue without any excess burden which can be used then to subsidize the industries in the protected group.

An alternative to the above option is the use of tariffs. Tariffs can provide the protection being sought without raising the revenue problem. Three points deserve to be noted with respect to optimal tariffs aimed at achieving the protection objective. First, the outcome achieved via tariffs will be inferior to that achieved via a combination of revenue-raising taxes

and output subsidies as described in the previous paragraph.⁷

Second, the outcome with tariffs alone will also be inferior to what can be achieved by combining them with output subsidies. If tariffs alone are used, their level will be higher than when they are combined with output subsidies. For instance, in Figure 1, if tariffs alone are used to raise the value of output of the two goods to $OX_1 + OX_2$, the required rate of (uniform) tariff will be t . But if we combine tariffs and subsidies, we can lower the tariff below t and compensate for the reduced protection by introducing an output subsidy financed by the tariff revenue. In this manner, we will be able to reduce the distortion in consumption. The optimal structure of tariffs, when combined with output subsidies, is nonuniform in general. The reason is that tariffs distort consumption and, moreover, revenue raising tariff are typically nonuniform.⁸

Finally, uniform tariffs can be justified as an optimal means of protection only when tariffs alone are used and we ignore the distortion in consumption caused by them. As it is arbitrary to ignore the distortion in consumption, this case for uniform tariffs is very weak.

The last point is illustrated in Figure 2 where demand is more elastic and supply less elastic for good 1 than for good 2. Suppose the country wants to maintain the total value of output of the two goods at X_2X_1 . This objective can be accomplished by taxing imports at the uniform rate t . The question which arises then is whether the country can do better by taxing

⁷Of course, in some developing countries, tariffs may be the only way to raise revenue in which case they become the first best instrument to achieve the protection objective.

⁸I discuss the revenue-raising optimal tariffs in Section 1.3.

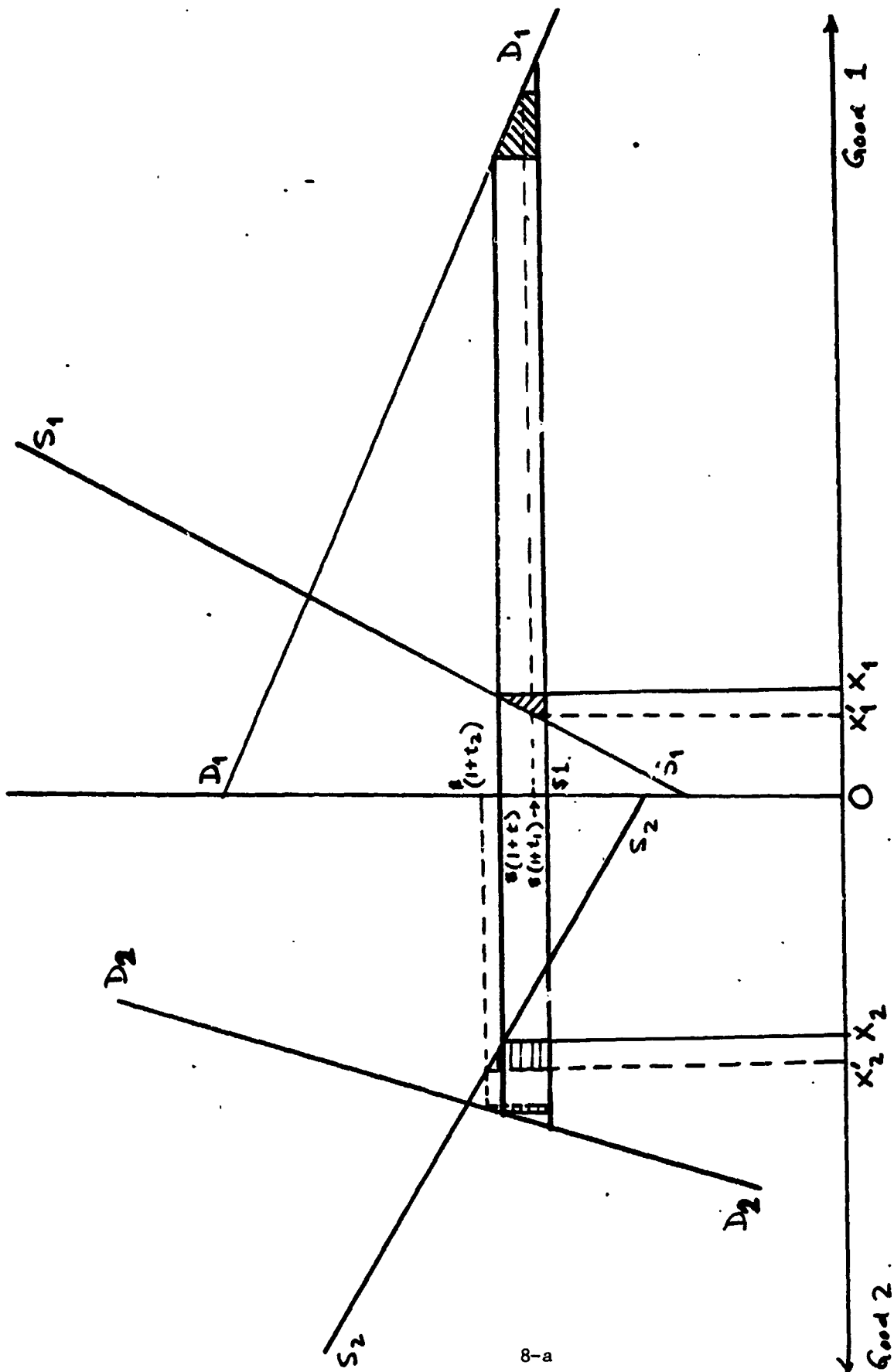


Figure 2

imports at different rates. It is easy to see that if we ignore the distortion in consumption, nonuniform tariffs will make things worse. Thus, if we lower the tariff on good 1 to t_1 and raise that on good 2 to t_2 such that $X_2X_1 = X'_2X'_1$, the additional loss represented by the shaded area under S_2S_2 will be necessarily higher than the additional gain represented by the shaded area under S_1S_1 . It is easy to see that the same is also true if we tax the imports of good 1 at a higher rate and those of good 2 at a lower rate.

This conclusion changes, however, if we incorporate the consumption distortion into the analysis. Thus in Figure 2, the gain in consumption in good 1 (the shaded area under D_1D_1) due to the lowering of tariff is so large relative to the loss in consumption in good 2 (shaded area under D_2D_2) due to the raising of tariff that it more than offsets the net loss via increased production distortion. Nonuniform tariffs can do better than a uniform tariff.

1.3 The Revenue Objective

In recent years, the greatest concern in the literature and at the Bank has been with the revenue objective. The optimal prescription in the presence of this objective depends critically on whether or not there are rents in the economy. These rents may take the form of profits or returns to inelastically supplied factors.⁹ If rents are present, revenue can be raised without distortion by taxing such rents. For instance, we are assuming that all factors of production are supplied inelastically. Therefore, revenue can be

⁹Unless otherwise noted, the term "inelastic supply" must be interpreted to mean zero elasticity of supply. By extension, "elastic supply" implies positive elasticity of supply.

raised costlessly via a tax on these factors. An indirect way to tax the factors in the present context is to tax the production or consumption of all goods at a uniform rate.¹⁰

The policy prescription is more complicated when some or all factors of production are supplied elastically as in the papers written in the Public Economics tradition (e.g., Diamond and Mirrlees (1971) and Dasgupta and Stiglitz (1974)).¹¹ Here the first step is to tax the rents available in the form of profits or returns to inelastically supplied factors.¹² An indirect way to perform this task is to tax the consumption of all commodities and subsidize the use of all elastically supplied factors at a uniform rate.¹³ This policy change does not introduce any distortions in the economy. If the revenue so raised is below the target, however, the optimal policy involves a 100% tax on all rents including profits and consumption taxes/subsidies on goods and factors along the Ramsey-Diamond-Mirrlees lines (see Dasgupta and Stiglitz 1974, and Dixit 1985 for details).

A common problem with respect to this last policy is that in practice it is very difficult to tax all rents at a 100% rate. Moreover, few countries

¹⁰In the presence of intermediate inputs and fixed endowments, a value added tax rather than production tax should be used.

¹¹An obvious example of elastically supplied factor is leisure.

¹²The standard example here is land.

¹³For example, if labor is the only elastically supplied factor, we should tax the consumption of all goods and subsidize the employment of labor at a uniform ad valorem rate. The wage subsidy is equivalent to a tax on leisure. Therefore, a uniform consumption tax and wage subsidy leaves the relative prices of all goods (including labor) unchanged.

are willing to make factor subsidies a part of taxation schemes aimed at raising revenue. Under such circumstances, optimal revenue raising taxes must include both production and consumption taxes or, equivalently, production and trade taxes. This point, made formally in Dasgupta and Stiglitz (1974), is often overlooked with the result that only consumption taxes/subsidies and not production and trade taxes are considered to be a part of optimal tax package.

In the remainder of this subsection, I wish to demonstrate that if a country is forced to rely exclusively on trade taxes for revenues, the optimal structure of such taxes will be nonuniform.¹⁴ This point is well recognized but an intuitive explanation of it helps clarify a common confusion. It is sometimes thought that if we ignore the distortion in consumption, uniform tariffs will be optimal. This conclusion is true only when the objective is protection but not when the country is constrained by a revenue requirement.

Consider Figure 3 which is similar to Figure 1. Note that the demand and supply curves for good 1 are more elastic than the corresponding curves for good 2. Therefore, the elasticity of demand for imports is higher for good 1 than for good 2. Maintaining the assumption of zero cross effects, I will demonstrate that good 1 should be taxed at a lower rate than good 2.

Suppose we want to raise revenue in the amount represented by areas ABDE plus FGJH. The uniform rate which will accomplish this task is given by t . The accompanying welfare cost is represented by the sum of triangles ALE, BDM, NFH and GRJ. It is easy to see that the same revenue can be raised at a lower

¹⁴It is worth reminding that given our assumption of fixed factor endowments, the optimal policy is to tax consumption or production at a uniform rate. This point is often forgotten. Thus, it is not uncommon to use a fixed endowments model for trade policy analysis and assert that the optimal policy must employ the Ramsey-Diamond-Mirrlees taxes.



Figure 3

cost by taxing good 2 more heavily and good 1 less heavily. Thus, tariffs at rates t_1 and t_2 subtract areas c and d (vertically shaded) from and add areas a and b (horizontally shaded) to the welfare cost. The net effect is favorable.

Observe that even if we were to ignore the distortion in consumption, a uniform tariff will be nonoptimal in the present situation. Relative to the uniform rate t , tariff rates t_1 and t_2 imply a gain of area c and a loss of area b due to changes in production distortion. Given the relative supply elasticities in the two sectors, area c is larger than area b.

This last result demonstrates the critical importance of the motive behind tariffs in determining their optimal structure. If the motive is protection and we ignore the distortion in consumption, a uniform tariff will be the right policy. But if the motive is revenue, a uniform tariff will fail to minimize the distortion cost even in production. The reason for this difference in results, in terms of Figure 3, is that in pursuing the protection objective we want to hold the horizontal distance constant whereas under the revenue constraint we wish to fix an area which necessarily has a horizontal as well as vertical dimension. In the latter case, elasticities of the relevant curves matter.

To understand the point intuitively, consider a good whose supply is entirely inelastic. Clearly, a tariff on this good will not help promote the protection objective. But if the objective is revenue, this good is an ideal candidate; all revenue can be raised by taxing this good at no social cost (ignoring the distortion in consumption, of course). At the other extreme, take a good with a very high elasticity of supply. The introduction of a small but finite tariff on this good will cause the supply to shrink by a large amount. The cost per dollar of revenue is high even at low tariff rates. But if protection is the objective, large supply response is good in that it helps attain the objective at a lower tariff rate than will be the case if supply was inelastic.

1.4 Importance of the Binding Constraint

In most practical situations, countries pursue more than one objective. Thus, even though revenue may figure prominently in discussions on trade policy reforms, protection as an objective is almost always present in the background. Under such circumstances, optimal tariff structure will be determined by the binding constraint. If the optimal tariffs to raise the desired revenue also fulfill the protection objective, revenue constraint is the binding one. Similarly, if optimal tariffs for protection allow the country to raise the desired revenue, protection constraint is the binding one. Ramsey considerations will be important in the former case but not in the latter. Finally, if both constraints are binding, we must superimpose the revenue-raising optimal tariffs on optimal protective tariffs.

2. Imported Intermediate Inputs

Let us now turn to the issue of taxation of intermediate inputs and provision of duty drawbacks on exports.¹⁵ Initially assume that there are two final goods and one intermediate input which is not produced at home. The input is used in both final goods. We seek to answer the following questions:

(i) Assuming a positive tariff on the final good but not on the input, is it welfare improving to introduce a tariff on the latter?

(ii) What if the tariff on the input is accompanied by a duty drawback on exports?

(iii) What is the answer to (ii) when we want to hold the revenue constant?

(iv) Now suppose that there is another exportable which does not use the imported input. How do our answers to (ii) and (iii) change?

¹⁵ The results in this section are derived formally in Panagariya (1989).

(v) Finally, suppose that in the initial equilibrium, there are tariffs on final as well as intermediate imports. Will the introduction of the duty drawback on exports have a welfare improving effect in this situation?

Let us take each of these questions in turn.

(i) As noted in the first paragraph of this section, let us assume that there are two final goods and an imported intermediate input.¹⁶ The importable good is subject to a tariff at rate t . Now suppose that we introduce a tariff on the input at rate τ . As the country is small, this tariff will leave the domestic relative price of the final-import good unchanged at $1+t$; the distortion in consumption will remain unaffected. The tariff on the input will, however, affect the distortion in production. The distortion will get worse or better depending on the relative intensity with which the input is used in the two goods and the initial tariff on the final importable.

Specifically, I demonstrate in the appendix that the tariff on the input improves or worsens welfare as $a_1/(1+t)$ is larger or smaller than a_2 where a_i denotes the quantity of input used per unit of output of good i ($i = 1, 2$). In the former case, introduction of a tariff on the input raises the production cost of good 1 relative to that of good 2 and reduces the anti-export bias which exists due to the initial tariff on good 1.

(ii) Next, consider the combined effect of the input tariff and a duty drawback on exports. In this case firms will receive a price equal to $1+\tau a_2$ for exports. Competitive pressure will imply that the price in the domestic market rise to the same level. Thus, from the production standpoint, the higher production cost of exportables resulting from the tariff on the input is exactly offset by the higher price received for the final product. By contrast, the importable does suffer from the extra cost. Thus, the net

¹⁶We will assume throughout the paper that value added and the intermediate input are used in constant proportions.

effect on the supply side is a contraction of the importable at the expense of the exportable which by itself is welfare improving. In addition, the rise in the domestic price of the exportable leads to a decline in the consumption of the exportable which reduces distortion in consumption.

Analytically, the effect of the tariff on input at rate τ combined with a duty drawback on exports is identical to that of a production tax at rate τa_1 on the importable and a consumption tax at rate τa_2 on the exportable. Both changes are welfare improving.

(iii) Now suppose that we introduce the revenue constraint. It is easy to see that in this case the welfare gains from the tariff on the input combined with a duty drawback will be larger than in (ii). As seen in (ii), these measures expand trade. Therefore, at constant t , revenues from final-good imports must rise. Moreover, the duty drawback applies to exports only. Duties collected on inputs used in the domestically sold exportable and the importable add further to revenues. It follows that if revenue is to be held constant, the tariff on the final importable can be reduced. This reduction in the tariff will confer further gains.¹⁷

(iv) Let us now introduce another exportable which does not use the imported input. A common concern is that the tariff on input combined with a duty drawback on exports may cause a contraction of this other export and lower welfare. It can be shown, however, that as long there are no other distortions in the economy, the welfare effect of a small tariff with duty

¹⁷ This analysis is based on the assumption that the economy is not in the Laffer range. That is to say, the initial tariff rate on the final good is not so high that a reduction in the tariff rate increases revenue. If the economy is in the Laffer range, a reduction in the tariff will increase both revenue and welfare without any complementary measures.

drawback will be unambiguously positive both with and without the revenue constraint. For large (noninfinitesimal) changes, the effect on welfare is ambiguous in general but the conditions under which welfare declines are strong. For example if the initial tariff on the final import is large or if the two exportables are unrelated in demand, welfare must rise. Each of these two conditions is sufficient but far from necessary to ensure welfare improvement.

(v) Finally, suppose that the initial equilibrium is characterized by tariffs on both the importable and the intermediate input. In this setting, the effect of the drawback is exactly the same as that of an export subsidy to the exportable using the input. Therefore, the drawback raises the domestic price of the exportable which, in turn, raises output and lowers consumption of the good. In a two-final-goods model, this change will be necessarily welfare improving. When we have two exportables and one importable where one exportable does not use the input, a small duty drawback is necessarily welfare improving while the effect of a large (noninfinitesimal) duty drawback is ambiguous in general. In the latter case, conditions under which welfare can decline are rather strong so that the presumption is in favor of a rise in welfare.

In concluding this section it may be noted that in the presence of a revenue constraint, optimal tariffs will be nonuniform in general. In particular, we will want to tax the imports of intermediate input and final goods at different rates. This conclusion holds true even when we allow for duty drawbacks on exports. To illustrate the point most simply, suppose that there is one final import and one intermediate input. Assume further that the input is used in the final importable only and that a given revenue is raised via a uniform tariff on the two imports. The net effect of this tariff will be to restrict final imports below the free trade level. Therefore, if we raise the tariff on the intermediate input by a small amount and lower that on

the final good just enough to hold the revenue constant, imports rise and welfare improve unambiguously. Thus, the uniform tariff is shown to be nonoptimal.

3. Nontraded Goods

Let us now introduce a nontraded goods sector. The results with respect to all four objectives discussed in Section 1 remain valid here. Therefore the principal new question of interest is whether the intermediate inputs used by this sector should be subject to tariff. This question has been analyzed by Ramaswami and Srinivasan (RS) (1968) in a one-factor, four-good model of a small open economy. The four goods are: a pure final importable (not produced at home), a pure exportable (not consumed at home), a nontraded good, and an imported input used in the latter two goods. RS assume that the country produces two goods, a pure exportable (not consumed at home) and a nontraded good. In this setting, RS demonstrate that if the government wants to raise a constant proportion of income in revenues, the optimal trade policy will involve (i) nonuniform tariffs on imports of the final good and the intermediate input and (ii) duty drawback on the use of the intermediate input in exports.

The basic RS result that revenue raising optimal trade taxes must include a positive tariff on the use of the intermediate input in the nontraded goods sector can be shown to hold in more general models. Specifically, it is not necessary to assume that the export good is not consumed and the import good is not produced at home.

4. The Uniform Tariff Issue Further Considered

4.1 The Case Against a Uniform Tariff

Our discussion in the previous sections demonstrates that the only clear case where a uniform tariff can be defended on grounds of efficiency arises

when the objective of trade policy is to restrict the value of imports at world prices (i.e. self-sufficiency). Unfortunately, this case has only limited applicability in actual trade reforms. Usually, self-sufficiency is not the principal motive behind trade restrictions.

The most important objectives behind trade restrictions in developing countries are revenue and protection. In the case of revenue, we have seen that uniform tariffs have no hope of being optimal.¹⁸ Under the protection constraint, the analysis in Section 1.2 shows that uniform tariffs could be optimal provided we are willing to ignore the distortion in consumption. But even this weak case is undermined by at least three factors.

First, smuggling is an integral part of international trade flows in a majority of developing countries. It can be safely asserted that all goods cannot be smuggled with uniform ease (or unease!) For instance, a 30 percent uniform tariff will surely lead to less effective protection for wrist watches than for automobiles. Therefore, a uniform tariff will normally fail to achieve in practice what it is expected to achieve in theory.

Second, most developing countries employ domestic taxes such as excise duty or value added tax. As is well recognized, these taxes will influence the degree of protection implied by a given set of tariffs. Therefore, unless one makes the domestic taxes uniform at the same time as trade taxes are made uniform, marginal distortion costs of protection in production will not be equalized across industries.

Finally, optimality of uniform tariffs in the presence of the protection objective (ignoring the distortion costs in consumption) depends critically on

¹⁸As noted earlier, tariffs are not the first best instrument for raising revenue. In our framework, revenue can be raised costlessly by taxing consumption or value added at a uniform rate.

the assumptions of constant returns to scale and perfect competition. Both of these assumptions are patently false in many industries in developing countries. Most countries have industries that exhibit increasing returns and are subject to entry regulations by the government. In many cases, the industry is a government monopoly. Under such circumstances, we cannot rely upon the conventional logic to evaluate the cost of protection imposed by a given set of tariffs. Recent research has shown that the presence of economies of scale and imperfect competition alters many of the conventional results dramatically.

4.2 The Case for a Uniform Tariff

In view of these considerations, the case for a uniform tariff cannot be made on grounds of efficiency in the conventional sense. Instead, such a case must be based on (i) transparency and administrative simplicity and (ii) the ability of uniform tariffs to deter the directly unproductive activities aimed at obtaining higher tariffs. Let me elaborate upon these points.

First, if tariffs are uniform, there is no question concerning the rate at which tariff is to be paid. This fact minimizes the incentive to misclassify goods and enables customs authorities to concentrate on ensuring that the value of goods is not understated. Delays in clearing goods for delivery will be reduced which is likely to generate significant gains especially when the goods are to be used in the production of exports. Uniformity in tariffs may also lead to simplification in import procedures and elimination of an intricate tariff code as a barrier to entry. A potential investor does not have to invest resources in figuring complex tariff regulations or in finding creative ways to bring high tariff goods under the guise of low tariff goods.

Uniform tariffs may also help minimize directly unproductive activities designed to obtain higher tariffs for at least three reasons. First, an

increase in the tariff rate brings limited gains due to the fact that tariffs on intermediate inputs rise at the same time that they rise on final product. Therefore, the incentive to invest in lobbying is reduced.

Second, collective action is more likely when gains from such an action are concentrated and when the group in question is relatively small (Olson, 1965). If the structure of tariffs is not subject to negotiation, the entire import competing sector will have to organize in order to lobby for an increase in the (uniform) tariff rate. Difficulties in organizing such a group are perhaps as formidable as those encountered in organizing consumer lobbies. By contrast, if nonuniformity in tariff is permitted, an individual industry can organize itself at a very low cost and has a better chance of success. If the tariff rate on all imports has to be raised (as will be the case under a uniform tariff regime), export and nontraded sectors that are hurt will be sure to take notice and provide counterforce to the efforts aimed at raising the tariff. By contrast, if the tariff is raised for one industry, the cost of such an action for an individual industry is likely to be small even though the total cost across all industries may be quite high. Consequently, very little counterforce will be provided. Or worse still, the counterforce will take the form of demand for increased protection by industries that are adversely affected.

Finally, it is easier to make a case for (more) protection when someone else is protected by a higher tariff. By contrast, the uniform tariff has the appearance of being equally protective of all import-competing industries. Admittedly, export industries are negatively protected but under most circumstances the desire to compensate them is not very strong.

These arguments suggest that in the long run, pressures from industries are likely to escalate protection more under a uniform than under a nonuniform tariff. If this hypothesis is correct, a strong case can be made for a uniform tariff on the ground that it is likely to be associated with a lower

average level of protection than nonuniform tariffs.

4.3 Evaluation

The analysis in this paper demonstrates that the optimal structure of tariffs aimed at achieving protection and revenue objectives is nonuniform. The presence of smuggling, economies of scale and imperfect competition further weaken an already weak case for uniform tariffs. The principal justification for uniform tariffs lies in transparency, administrative simplicity and relatively low level of directly-unproductive profit-seeking activities. Thus, there is a conflict between the implications of the conventional efficiency analysis and political-economy considerations. In the ultimate, the issue is empirical and more systematic work needs to be done in this area.

5. A Summary of the Literature

In this section, I will provide a brief description of the literature on the issues considered in the present paper.

To my knowledge, the first detailed investigation of optimal tariff structure to protect a group of industries was presented by Johnson (1964) in a somewhat neglected but thought-provoking paper entitled "Tariffs and Economic Development: Some Theoretical Issues".¹⁹ In this paper, Johnson demonstrated that the optimal policy for protecting a group of industries was a uniform subsidy, not uniform tariff. He further noted that a uniform tariff will be optimal if the policy objective was to restrict imports of a group of commodities. Johnson also discussed in detail the importance of intermediate

¹⁹ Interestingly, the paper was published as the lead article in the inaugural issue of the Journal of Development Studies.

inputs in the design of tariff policy and noted the formula for effective protection which he called the "implicit rate of protection".

Johnson did not analyze, however, the optimal tariff problem in the presence of the revenue constraint. This task was undertaken for the first time by Ramaswami and Srinivasan (RS) (1968) in a one-factor, four-good model of a small open economy. As noted in Section 4, RS assume that the country produces two goods, a pure exportable (not consumed at home) and a nontraded good. Both goods use an imported intermediate input in production. There are two consumables, the nontraded good and a pure import (not produced at home). In this setting, RS demonstrate that if the government wants to raise a constant proportion of income in revenues, the optimal trade policy will involve (i) nonuniform tariffs on imports of the final good and the intermediate input and (ii) duty drawback on the use of the intermediate input in exports.

The problem of revenue-neutral optimal tariffs has been studied in a more general model by Dasgupta and Stiglitz (DS) (1974). This paper and some of the subsequent literature (e.g., Dixit, 1985) is written in the Ramsey (1927) Diamond-Mirrlees (1971), Public Economics tradition. DS allow for firm-level profits and the results depend critically on whether or not these profits can be taxed away entirely. The case when a 100 percent profit tax is levied is equivalent to the Diamond-Mirrlees constant returns case. Assuming that the only taxes available (other than the profit tax) are trade taxes, DS obtain the following results. (i) If a 100 percent profit tax cannot be imposed, intermediate inputs should be subject to trade taxes in the same way as the final goods (DS p. 15). (ii) If a 100 percent profit tax can be levied, however, "the output of intermediate goods should not be changed from what it would be at international prices." "Goods which are used both as inputs into production and as consumption goods should be taxed (if it is impossible to treat the same good differently according to use)." Recently,

Stern (1987, pp. 82-83) has argued that optimal trade taxes do not include taxes on intermediate inputs. Corden (1974, pp. 70-76) provides intuitive discussion of optimal tariffs for revenue and concludes, contrary to Stern, that "an optimum revenue tariff structure is likely to include tariffs on inputs".²⁰

Recently, a series of papers written at the World Bank have explored further the issue of optimal tariff structure. Dahl et al (1986) employ a multi-factor multi-commodity model in which all factors are supplied in fixed quantities and there are no intermediate inputs. They derive optimal tariffs necessary to raise a fixed revenue and demonstrate several analogies between such tariffs and Ramsey taxes. Mitra (1987) gives explicit consideration to inter-industry flows. He derives optimal tariffs in the presence revenue objective as well as protection constraint. Both Dahl et al and Mitra experiment with computable general equilibrium models and derive optimal tariffs in specific cases.²¹ Another paper, written by Chambers (1989), employs a model similar to that in Ramaswami and Srinivasan and derives conditions under which uniform tariffs are optimal.²² Not surprisingly, these conditions are very stringent and unlikely to be met except by accident. Chambers also discusses in detail the welfare implications of imposing a tariff on the intermediate input. Finally, mention may be made of Harberger

Also see Corden (1982).

²¹ Mention may also be made here of Heady and Mitra (1985).

²² Chambers' model is more general in one way but less so in another. Thus, unlike RS he allows for the production of the importable and consumption of the exportable. But while RS distinguish between tariffs on the use of the intermediate input in exportable and nontraded good, he employs a single tariff on the intermediate input.

(1988), Shalizi and Squire (1988) and Balassa (1989) who provide analytic discussions of these issues, although without recourse to formal models.

Before concluding this section, reference may be made to two additional bodies of literature. First, some of the earlier trade theoretic literature which appeared under the title of "noneconomic objectives" dealt with issues very similar to those discussed in the literature cited above. Thus, Bhagwati and Srinivasan (1969) provide a systematic discussion of optimal intervention policies in the presence of import, protection and consumption objectives in a two-sector model. The principal insight in this paper is that the optimal method of achieving an objective is to choose that policy which affects the objective directly. Thus, tariffs are the first best instrument to restrict imports, production subsidies to protect a given set of industries and consumption taxes to restrict consumption. Tan (1971) generalizes the Bhagwati-Srinivasan analysis to models incorporating inter-industry flows, imported intermediate inputs and nontraded goods. Finally, Vandendorpe (1974) extends the analysis to a multi-commodity framework. He demonstrates that in a small open economy, if the instrument chosen to achieve an objective is optimal, the tax or subsidy on various goods should be at a uniform rate. This literature has been synthesized and refined in the well-known survey by Bhagwati (1971). Dixit and Norman (1980, ch. 6) provide a mathematical treatment of the same issues using the dual approach.

Second, the literature on partial reforms seeks to analyze the welfare effects of small changes in the tariff rate given an initially distorted equilibrium. The seminal contribution here is the paper by Bertrand and Vanek (1971) which demonstrates that equalization of the highest tariff to the next highest one improves welfare as long as net import demands do not exhibit complementarities. Additional contributions to this literature include Bruno (1972), Lloyd (1974), Fukushima (1979), Smith (1980) and Dixit (1985).

6. Summary of the Paper

The following are the main results discussed in Sections 1-3.

First, if a country wishes to limit the value (at world prices) of some or all of its imports, the first best optimal policy is a uniform tariff. This result holds under very general conditions.

Second, if the objective is protection to a group of industries, the first best is a uniform output subsidy provided revenue can be raised costlessly. If revenue cannot be raised costlessly, the optimal revenue-raising taxes must be superimposed on the uniform subsidy. In the event that the country lacks the ability to use domestic taxes, tariffs will become the first-best instrument for protection. The optimal structure of such tariffs will be nonuniform.

Third, optimal instruments for raising revenue are rather sensitive to model specification. If rents are absent but labor-leisure choice is present as in Diamond and Mirrlees, the optimal instrument is a consumption tax or subsidy on goods as well as factors. If rents are present however, optimal instruments include both consumption and trade (or production) taxes. If all factor supplies are fixed, a uniform tax on consumption or value added must be used.

Fourth, assuming fixed endowments and no domestic taxes, optimal tariffs to raise a fixed revenue will be nonuniform. This conclusion remains valid even if we ignore the distortion in consumption.

Fifth, revenue-neutral trade taxes will generally include tariffs and subsidies on intermediate inputs. Broadly speaking, tariffs on intermediate inputs combined with duty drawbacks on exports are welfare improving both with and without revenue constraint. As a general rule, a policy change that causes the output to fall and consumption to rise in the protected sector is welfare improving.

Finally, I have discussed (Section 4) in detail the case for and against uniform tariffs. My main conclusion is that the conventional efficiency criteria point towards nonuniformity in tariffs while transparency, administrative convenience and political economy considerations point in the opposite direction. In view of this conflict, the issue of desirability of uniform tariffs is ultimately empirical. More work in this area is required.

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